

WHAT IS CLAIMED IS:

1. A method of encompassing a data stream, comprising:  
compressing vectors from the data stream using one or more Multiple  
Attractor Cellular Automatas (MACAs); and  
5 encrypting the compressed vectors using multiple Cellular Automata (CA)  
transforms.
2. The method of Claim 1, wherein compressing the vectors and  
encrypting the compressed vectors is a single integrated process implemented with a  
10 program executed on a Programmable CA (PCA).
3. The method of Claim 1, further comprising generating a code-book,  
the one or more MACAs operable to perform binary searches in the code-book to  
compress the vectors from the data stream.  
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4. The method of Claim 3, further comprising storing the code-book  
using one or more multi-stage MACA-based two class classifiers which act as implicit  
memory to store the code-book.
- 20 5. The method of Claim 1, wherein compressing the vectors from the data  
stream using one or more MACAs comprises deriving code-book indices for the  
vectors.
6. The method of Claim 1, wherein encrypting the compressed vectors  
25 using multiple CA transforms comprises using a series of reversible transforms that  
use one or more of linear CA, additive CA, and non-linear CA configured in a PCA at  
one or more different time steps.
7. The method of Claim 6, comprising encrypting the compressed vectors  
30 using four levels of CA transforms.

8. The method of Claim 7, wherein encrypting the compressed vectors using multiple CA transforms comprises using one or more of linear transformations, affine transformations, and non-affine transformations.

5 9. The method of Claim 1, further comprising transmitting the encompassed data across a communications link.

10. The method of Claim 9, further comprising decrypting the transmitted encompassed data using multiple CA transforms.

11. Logic encoded in media for encompassing a data stream, when executed the logic operable to:

compress vectors from the data stream using one or more Multiple Attractor Cellular Automatas (MACAs); and

5 encrypt the compressed vectors using multiple Cellular Automata (CA) transforms.

12. The logic of Claim 11, operable to compress the vectors and encrypt the compressed vectors in a single integrated process implemented with a  
10 Programmable CA (PCA).

13. The logic of Claim 11, further operable to generate a code-book, the one or more MACAs operable to perform binary searches in the code-book to compress the vectors from the data stream.

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14. The logic of Claim 11, further operable to store the code-book using one or more multi-stage MACA-based two class classifiers which act as implicit memory to store the code-book.

20 15. The logic of Claim 11, operable to compress the vectors from the data stream using one or more MACAs by deriving code-book indices for the vectors.

16. The logic of Claim 11, operable to encrypt the compressed vectors using multiple CA transforms by using a series of reversible transforms that use one  
25 or more of linear CA, additive CA, and non-linear CA configured in a PCA at one or more different time steps.

17. The logic of Claim 15, operable to encrypting the compressed vectors using four levels of CA transforms.

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18. The logic of Claim 17, operable to encrypt the compressed vectors using multiple CA transforms by using one or more of linear transformations, affine transformations, and non-affine transformations.

5           19. The logic of Claim 11, further operable to transmit the encompassed data across a communications link.

20. The logic of Claim 19, further operable to decrypt the transmitted encompassed data using multiple CA transforms.

21. A system for encompassing a data stream, the system comprising:  
a first module operable to compress vectors from the data stream using one or  
more Multiple Attractor Cellular Automatas (MACAs); and  
a second module operable to encrypt the compressed vectors using multiple  
5 Cellular Automata (CA) transforms.

22. The system of Claim 21, wherein the first module is operable to  
compress the vectors and the second module is operable to encrypt the compressed  
vectors in a single integrated process implemented with a Programmable CA (PCA).

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23. The system of Claim 21, wherein the first module is further operable to  
generate a code-book, the one or more MACAs operable to perform binary searches  
in the code-book to compress the vectors from the data stream.

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24. The system of Claim 21, wherein the first module is further operable to  
store the code-book using one or more multi-stage MACA-based two class classifiers  
which act as implicit memory to store the code-book.

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25. The system of Claim 21, wherein the first module is operable to  
compress the vectors from the data stream using one or more MACAs by deriving  
code-book indices for the vectors.

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26. The system of Claim 21, wherein the second module is operable to  
encrypt the compressed vectors using multiple CA transforms by using a series of  
reversible transforms that use one or more of linear CA, additive CA, and non-linear  
CA configured in a PCA at one or more different time steps.

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27. The system of Claim 26, wherein the second module is operable to  
encrypt the compressed vectors using four levels of CA transforms.

28. The system of Claim 27, wherein the second module is operable to encrypt the compressed vectors using multiple CA transforms by using one or more of linear transformations, affine transformations, and non-affine transformations.

5           29. The system of Claim 21, further operable to transmit the encompassed data across a communications link.

30. The system of Claim 27, further operable to decrypt the transmitted encompassed data using multiple CA transforms.

31. A system for encompassing a data stream, comprising:  
a programmable CA (PCA) operable to receive vectors from the data stream;  
a program memory operable to communicate with the PCA;  
an index memory operable to communicate with the PCA; and  
5 an index register operable to communicate with the index memory;  
the program memory storing a program operable to:  
    configure the PCA with a rule vector of a CA; and  
    enable the PCA to be run through a number of cycles controlled by the  
program, a resulting Pseudo-Exhaustive Field (PEF) value being directed to address  
10 the index memory;  
    the index memory providing values to the index register, enabling a code-book  
index to be generated for an input vector loaded into the PCA.
32. The system of Claim 31, wherein the index memory comprises a 1-bit  
15 index memory, the resulting value directed to the index memory comprising a PEF of  
an attractor state of the CA.

33. A method for encompassing a data stream, comprising:  
receiving at a programmable CA (PCA) vectors from the data stream;  
using a program stored in a program memory in communication with the PCA:  
configuring the PCA with a rule vector of a CA; and  
5 enabling the PCA to be run through a number of cycles controlled by  
the program, a resulting Pseudo-Exhaustive Field (PEF) value being directed to  
address an index memory in communication with the PCA, the index memory  
providing values to an index register in communication with the index memory,  
enabling a code-book index to be generated for an input vector loaded into the PCA.

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34. The method of Claim 33, wherein:  
the index memory comprises a 1-bit index memory; and  
the resulting value comprises a PEF of an attractor state of the CA.

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